10/521157
JT12 Rec'd PCT/PTO 13 JAN 2005

APPLICATION UNDER UNITED STATES PATENT LAWS

Atty. Dkt.: 2545-0463

Invention: A CONTAINER AND A METHOD FOR ITS MANUFACTURE

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This is a:

- ☐ Provisional Application
- ☐ Regular Utility Application
- ☐ Continuing Application
  - ☐ The contents of the parent are incorporated by reference
- ☒ PCT National Phase Application
- ☐ Design Application
- ☐ Reissue Application

SPECIFICATION

This application claims priority to Italian Patent application number BO2002A 000487, filed July 25, 2002, which is incorporated by reference herein.

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Description

A container and a method for its manufacture

Technical Field

The present invention relates to a container, in particular for preserving food products, and to a method of manufacturing such a container.

The present invention is applicable to the food sector, and in particular to the preserving of liquid food products such as milk, fruit juices, yoghurt, mineral water and the like, of which the chemical and organoleptic properties can easily be adulterated and degraded.

Background Art

It is a standard practice for liquid products of the type in question to be bottled in containers fashioned from multilayer or treated paper material, such as paperboard or cardboard faced with one or more layers of an impermeable and antiseptic coating, typically polyethylene among others.

These containers are generally erected from flat blanks cut from a roll of continuous strip material carried by a reel. Each blank prepared in this way will also undergo a scoring operation that serves to impress a plurality of crease lines defining the shape of the container being manufactured.

More particularly, each blank emerges from the scoring operation presenting longitudinal, transverse and angled crease lines. The longitudinal crease lines extend generally along the full length of the blank so that it can be caused by an initial bending operation to assume a substantially tubular shape that will be fixed permanently by a seal or weld applied along one overlapping longitudinal side edge of the blank. The transverse crease lines are located generally near the free transverse edges of the blank and will extend across the full width of the material in such a way as to delimit two opposite end portions which, when subjected to further bending and sealing operations, will establish a closed bottom end and a top outlet portion of the finished container.

The angled crease lines extend typically across the end portions of the blank, between the transverse crease lines and the free transverse edges, and serve to facilitate the steps of forming the bottom end and the outlet portion of the container in production.

Regarding the operation by which the bottom end of the container is formed, this will be accomplished generally by bending and folding the respective end portion along mutually opposed segments of the relative transverse crease line. In this way, with the aid of the angled creased lines, the structure of the end portion can be forced perpendicular to the longitudinal dimension of the relative container, appearing initially as two matching and partly overlapping halves of trapezoidal outline.

After the bending and folding operation, the two trapezoidal halves are sealed along the line of the overlap so as to create a square central portion, corresponding to the bottom end of the container, flanked by two lateral portions of layered structure and triangular outline identifiable as respective stiffening elements, projecting perpendicularly from the structure of the container in production.

The longer base of each triangular stiffening element coincides typically with a respective segment of the transverse crease line delimiting the relative end portion, so that the stiffening elements can be bent along the respective longer bases and folded into a position within the outline of the square central portion, each occupying a plane substantially parallel to the plane occupied by the selfsame central portion. In this situation, the stiffening elements are directed toward one another, converging on the middle of the square central portion.

At this juncture, the stiffening elements undergo a sealing operation by which they are anchored to the middle of the square central portion, thus completing the bottom end of the respective container.

The semi-erected container now undergoes a further bending operation serving to form the outlet portion, which can either be sealed permanently in a totally enclosed configuration or furnished with a neck piece incorporating a removable closure.

Whilst it is true that conventional containers for preserving liquid food products create an environment

affording protection from harmful bacterial agents, the applicant discerns that they are by no means free of certain drawbacks concerned mainly with the problem of ensuring that the contents will keep and not spoil, but also with the costs of manufacturing and marketing the containers.

More exactly, the structure of such conventional containers, and specifically the folded bottom end, presents one or more interstitial spaces created by the stiffening elements and affording gaps in which undesirable liquids such as cleansing or flushing fluids can collect and remain trapped until the moment when the container is filled with the liquid food product. Needless to say, the food product will mingle ultimately with these trapped fluids, becoming irreversibly contaminated and degraded.

Attempts to overcome the aforementioned drawback have included the adoption of numerous operations that involve drying and monitoring the conditions internally of the containers in production. However, these operations tend to dictate considerably longer processing times in manufacture, as well as a marked increase in production costs, factors which impact in their turn on the costs of marketing the containers.

The object of the present invention is to overcome the problems presented by the prior art by providing a container, in particular for preserving food products, such as will be devoid of interstitial spaces and offer comparatively modest production and marketing costs.

Disclosure of the Invention

The stated object and others besides, which will emerge more clearly from the following specification, are substantially realized according to the invention in a container, in particular for preserving food products, consisting in a hollow structure obtainable by bending and sealing at least one substantially flat blank and comprising: a containing portion providing an enclosure in which to accommodate at least one preservable product, presenting at least one side wall furnished with at least one end portion adaptable by bending and sealing operations in such a way as to fashion a bottom end; and an outlet portion located at the end opposite to the bottom end, permanently associated with the side wall of the containing portion and combining to establish the enclosure at least in part, characterized in that the bottom end fashioned from the end portion of the side wall presents at least one area of layered structure delimited by at least one seal positioned to isolate the selfsame area of layered structure from the enclosure of the container, thereby ensuring that the enclosure encompasses a volume devoid of interstitial spaces and/or stagnation points.

According to a further aspect of the invention, the aforementioned objects are realized similarly in a container, in particular for preserving food products, consisting in a hollow structure obtainable by bending and sealing at least one substantially flat blank and comprising: a containing portion

providing an enclosure in which to accommodate at least one preservable product, presenting at least one side wall furnished with at least one end portion adaptable by bending and sealing operations in such a way as to fashion a bottom end; and an outlet portion located at the end opposite to the bottom end, permanently associated with the side wall of the containing portion and combining to establish the enclosure at least in part, characterized in that the outlet portion presents at least one spout, by which the food product in the container can be caused to follow a predetermined preferential flow direction, and in that such a spout consists in a part of the outlet portion furnished with at least two crease lines extending divergently toward a free edge of the outlet portion and capable of alternating between a non-operating condition in which the container is closed with the spout retracted into the outlet portion and presenting a substantially flat configuration, and an operating condition in which the container is open with the spout projecting from the selfsame outlet portion.

The objects of the present invention are realized likewise in a method of manufacturing containers, in particular for preserving food products, utilizing a substantially flat blank of material presenting a plurality of crease lines generated by a scoring operation, and comprising the steps of: causing the blank to assume a substantially tubular shape establishing at least one side wall of the container

in production; fixing the blank to retain the tubular shape; bending the tubular blank along at least two mutually opposed segments of a transverse crease line delimiting an end portion of the side wall so that the end portion is caused to bend along angled crease lines departing from the transverse crease line and extending convergently toward a free transverse edge of the tubular blank, in such a way as to create a bottom end of the container in production, and at least two mutually opposed stiffening elements of layered structure; fixing the bottom end and the stiffening elements by sealing together at least two joined faces of the free transverse edge presented by the tubular blank; bending the end portion further along mutually opposed segments of the transverse crease line delimiting the stiffening elements so that these same elements are flattened over the bottom end; and securing the stiffening elements to the bottom end, characterized in that it comprises the further step of sealing the layered structure presented by each stiffening element along the corresponding segment of the transverse crease line.

The invention will now be described in detail, by way of example, with the aid of the accompanying drawings, in which:

-figure 1 is a perspective view of a container according to the present invention, illustrated in a first embodiment;

-figure 2 illustrates a blank from which to fashion the container of figure 1;

-figure 3 is a perspective view of a partly formed container as in figure 1;

-figure 4 is a fragmentary perspective view of a container as in figures 1 and 3, shown up-ended and with a bottom end partly formed;

-figure 5 is a second fragmentary perspective view of a container as in figures 1, 3 and 4, shown up-ended and with the bottom end nearly formed;

-figure 6 is a further fragmentary perspective of the container as in figures 1 to 5, shown up-ended and with the bottom end completely formed;

-figure 7 is a perspective view of a container according to the present invention, illustrated in a second embodiment;

-figure 8 illustrates a blank from which to fashion the container of figure 7;

-figure 9 is a fragmentary perspective view of a closed container according to the present invention, illustrated in a third embodiment;

-figure 10 is a fragmentary perspective view of the container in figure 9, shown in an open condition;

-figure 11 illustrates a blank from which to fashion the container of figures 9 and 10.

With reference to the drawings, 1 denotes a container, in its entirety, and in particular a container for preserving food products according to the present invention.

As indicated in figures 1, 3, 4, 5, 7, 9 and 10, the container 1 comprises a containing structure 2 obtainable by bending and sealing at least one flat

blank 1a that will be described in due course. The containing structure 2 of the container 1 comprises a containing portion 3 establishing an enclosure 4 (figure 3) such as can be filled with at least one liquid food product, and an outlet portion 5 by way of which the food product occupying the enclosure 4 can be poured or otherwise extracted.

The containing portion 3 comprises at least one side wall 6 presenting an end portion 7 such as can be adapted by a sequence of bending and sealing operations to form a bottom end 8 disposed substantially perpendicular to the longitudinal dimension of the container 1.

Figure 1 and figures 3 to 6 illustrate a first embodiment of the invention in which the side wall 6 of the containing portion 3 presents a preferred geometry of substantially prismatic outline and square cross section, with four substantially identical and rectangular faces 6a. Similarly, the end portion 7 (figure 3) of the side wall 6 presents four faces 7a extending from the respective faces 6a of the side wall 6 along the longitudinal dimension of the container 1, with no break in continuity.

Figure 7 illustrates a second embodiment of the invention in which, by contrast, the side wall 6 presented by the containing portion 3 of the container 1 is substantially cylindrical and of circular cross section.

Naturally, the description of these two solutions characterizing the shape of the container 1 implies

no limitation whatever on the present invention, of which the scope might embrace other shapes and embodiments different to those disclosed by way of example.

The aforementioned outlet portion 5 extends from the end of the containing portion 3 opposite to the bottom end 8, and encompasses the enclosure 4 at least in part. More exactly, the outlet portion 5 presents four faces 5a integral with and angled in relation to the side wall 6, combining to create a substantially frustopyramidal and funnel-like element tapering away from the side wall 6.

As illustrated in figures 1 and 7, the container 1 is furnished preferably with at least one neck piece of substantially tubular embodiment, denoted 9, secured to the topmost extremity of the outlet portion 5 remote from the containing portion 3, and a relative closure element or cap 9a fitted over or screwed onto the neck piece 9 in removable fashion so that the container 1 can be securely closed.

The scope of the invention is in no sense limited by the illustration of the neck piece 9, since the container 1 could be furnished equally well with other systems by means of which to effect a closure and/or to pour or otherwise extract the food product.

Alternatively, and with reference to a third embodiment of the invention, the container 1 can be furnished with an outlet portion 5 fashioned as in figures 9 and 10, that is to say with a familiar gable top, secured by a seal effected along a raised

seam closure 5b extending across the full transverse dimension of the container 1.

In the example of figure 10, the outlet portion 5 affords crease lines 5c serving, when the container 1 is opened typically by separating and spreading the joined parts of the raised seam closure 5b, to create a pouring spout 5d such as will allow the food product to follow a predetermined preferential flow direction when dispensed.

In particular, the pouring spout 5d is capable of alternating between a non-operating condition, in which the container 1 is closed and the spout 5d is folded flat into the raised seam closure 5b of the outlet portion 5, and an operating condition in which the container 1 is open and the pouring spout 5d projects from the outlet portion 5, presenting a substantially Vee-shaped cross-sectional profile.

In the case of the bottom end 8, described by way of example with reference to figures 4, 5 and 6, this presents a substantially square outline over which the two mutually opposed stiffening elements 10 fashioned from the end portion 7 of the side wall 6 are folded and flattened.

In particular, each stiffening element 10 presents a layered structure consisting in two thicknesses of material, produced as a result of the end portion 7 being folded double, and a substantially isosceles triangular outline of which the base coincides with one corresponding side of the bottom end 8 and the vertex 10b opposite the base 10a is directed toward

the middle of the selfsame bottom end (figure 6). Once folded into this position, each stiffening element 10 is sealed to the bottom end 8 at one or more points to ensure a permanent bond.

It will be observed also that the layered structure of each stiffening element 10 is totally enclosed around the periphery, since the only side left open initially during the bending operation by which the end portion 7 of the side wall 6 is folded and flattened, in other words the base 10a of the triangle, will be closed off by a relative seal 10c effected along this same base 10a (figure 5).

In like manner to the structure of the bottom end 8 described above, the bottom end 8 of the cylindrical container 1 illustrated in figure 7 presents a similar structural configuration obtained preferably by bending and sealing the end portion 7 of the side wall 6 in the same fashion.

As illustrated in figure 2, the blank 1a utilized in manufacturing the container 1 of figures 1, 3, 4, 5 and 6 is of substantially rectangular outline and presents a plurality of crease lines 11 generated by means of a scoring operation.

In detail, the blank 1a presents four longitudinal crease lines 11a extending along its entire length and delimiting the faces 5a, 6a and 7a of the outlet portion 5, the side wall 6 and the end portion 7 of the side wall, respectively.

The blank 1a also presents two transverse crease lines 11b extending substantially perpendicular to

the longitudinal crease lines 11a and at a short distance from respective free transverse edges 12 of the blank. Observing figure 2, it will be seen that the transverse crease lines 11b extend the full width of the blank 1a, separating the outlet portion 5 and the end portion 7 from the side wall 6 of the container 1.

In addition, the blank 1a presents a set of angled crease lines 11c both on the outlet portion 5, serving to determine the shape of this same portion, and on the end portion 7 of the side wall 6.

More exactly, each face 5a of the outlet portion 5 presents a pair of angled crease lines 11c departing from respective points of intersection between the transverse crease line 11b and the corresponding longitudinal crease lines 11a, and extending convergently toward the respective free transverse edge 12 of the blank. Each angled crease line 11c thus combines with the relative longitudinal crease line 11a to delimit a triangular area 13 that will be offered flat and sealed to a corresponding triangular area 13 delimited by the selfsame longitudinal crease line 11a and an angled crease line 11c presented by the adjoining face 5a.

As discernible from figure 2, the angled crease lines 11c presented by the end portion 7 of the side wall 6 occupy only two faces 7a of this same portion. In particular, the faces 7a of the terminal portion 7 exhibiting the angled crease lines 11c are arranged alternately with the two faces 7a having no angled

crease lines 11c.

Like the lines already described, the angled crease lines 11c of the end portion 7 depart from respective points of intersection between the transverse crease line 11b and the corresponding longitudinal crease lines 11a, and extend convergently toward the respective free transverse edge 12 of the blank, in this instance meeting at the selfsame edge 12 and thus delimiting three triangular areas 14 on each of the two faces 7a that will be folded ultimately to create the respective stiffening elements 10.

Referring to figure 8, the cylindrical container 1 of figure 7 is fashioned from a blank 1a without longitudinal crease lines, presenting two transverse crease lines 11b of substantially curvilinear and irregular appearance delimiting the outlet portion 5, the side wall 6 of the containing portion 3 and the end portion 7 of the side wall, respectively.

In particular, the transverse crease line 11b delimiting the outlet portion 5 of the container 1 extends the full width of the blank 1a along consecutive curved segments 11d each coinciding with the base of a respective face 5a presented by the outlet portion 5. Similarly, the transverse crease line 11b delimiting the end portion 7 of the side wall 6 extends the full width of the blank 1a along consecutive curved segments 11d each coinciding with the base of a respective face 7a presented by the end portion 7.

In the case of the outlet portion 5, the blank 1a

presents a set of angled crease lines 11c departing from respective points of connection joining the curved segments 11d of the transverse crease line 11b and extending toward the relative free transverse edge 12.

As shown in figure 8, two angled crease lines 11c will depart preferably from each point of connection joining the curved segments 11d and extend divergently toward the transverse edge 12 of the blank 1a, one on either side of a longitudinal crease line 11a. The longitudinal crease line 11a combines with the two angled crease lines 11c to create respective triangular areas 13 that will be offered flat and sealed one to another.

Observing the end portion 7, or bottom end 8, the blank presents a set of angled crease lines 11c departing from respective points of connection joining the curved segments 11d of the transverse crease line 11b and extending toward the relative free transverse edge 12 of the blank 1a.

More exactly, the angled crease lines 11c presented by the end portion 7 occupy only two faces 7a of this same portion, departing in pairs from respective points of connection joining the curved segments 11d and extending convergently from the selfsame segments to meet at points coinciding with the relative transverse edge 12. The angled crease lines 11c will be seen in figure 8 to define two substantially triangular areas 14 and two substantially semi-elliptical areas 14a arranged in alternation one with

another.

In the example of figure 11, the blank 1a used to manufacture the container 1 of figures 9 and 10 appears much the same as the blank 1a (figure 2) used to manufacture the container 1 of figure 1, at least in terms of the side wall 6 and the end portion 7.

In the case of the outlet portion 5, by contrast, the blank 1a presents an auxiliary crease line 12a interposed between the relative transverse crease line 11b delimiting the outlet portion 5 and the relative free transverse edge 12 of the blank. More exactly, the auxiliary crease line 12a extends substantially parallel to the transverse edge 12, delimiting the area 5b of the outlet portion that will be sealed ultimately to close the container 1.

In this type of embodiment, the blank 1a also presents a set of angled crease lines 11c placed differently to the angled crease lines 11c on the outlet portion 5 of the blank 1a shown in figure 2. As illustrated in figure 11, each face 5a of the outlet portion 5 presents a pair of angled crease lines 11c departing from respective points of intersection between the transverse crease line 11b and the corresponding longitudinal crease lines 11a, extending convergently toward and meeting at the auxiliary crease line 12a in such a way as to create three substantially triangular areas 13.

The blank 1a also presents angled crease lines 5c extending between the auxiliary crease line 12a and the relative free transverse edge 12, that is to say

across the area that will be sealed to provide the seam closure 5b. It will be seen from figure 11 that these angled crease lines 5c are associated with only two faces 5a of the outlet portion 5, arranged in alternation with the two remaining faces 5a.

More exactly, the angled crease lines 5c occupying the area of the seam closure 5b extend substantially in divergent pairs toward the transverse edge 12 of the blank 1a in such a way as to define respective triangular areas, each constituting a relative pouring spout 5d of the container 1. In order to give each spout 5d a substantially Vee-shaped profile, the blank 1a also presents a central fold line 12b associated with each pair of angled crease lines 5c occupying the area of the seam closure 5b. The fold line 12b in question bisects the area compassed between the pair of angled crease lines 5c so as to establish the preferential flow path afforded by the spout 5d.

With regard to the method by which the container 1 is erected, the steps involved in forming the container of figure 1 will now be described by way of example. The relative blank 1a (figure 2) is bent initially along the longitudinal crease lines 11a to produce an element of substantially tubular configuration (figure 3). At this point, the blank undergoes a sealing operation serving to anchor one overlapped longitudinal edge 15 and thus fix the tubular shape produced by the initial bending step. As a result of this same step, as discernible from

figure 3, the longitudinal crease lines 11a will provide four corner edges combining to establish the shape of the container 1, at least in part.

Thereafter, the end portion 7 of the side wall 6 undergoes a further bending operation effected along mutually opposed segments of the transverse crease line 11b, serving to establish the bottom end 8 of the container 1, at least in part (figure 4).

More particularly, the step by which the end portion 7 is bent will be performed preferably on the segments of the crease line 11b coinciding with the faces 7a of the selfsame portion devoid of angled crease lines 11c. Thus, the faces 7a in question are rotated inward and toward the enclosure 4 to the point at which they are positioned substantially perpendicular to the longitudinal dimension of the container 1. During the course of this step, the faces 7a of the end portion 7 furnished with angled crease lines 11c will be forced to deform by the displacement of the first two faces 7a, and to bend ultimately along the selfsame angled lines 11c. In this way, the end portion 7 assumes an outline and a position different to those of the initial tubular configuration.

As illustrated in figure 4, the faces 7a of the end portion 7 not provided with angled crease lines 11c assume a position perpendicular to the longitudinal dimension of the container 1 and compassed within its cross-sectional area, their edges joined along an area denoted 16 coinciding with a median plane of the

selfsame container.

By contrast, the faces 7a scored with angled crease lines 11c are bent double and caused to assume a substantially triangular shape generated by the various triangular areas 14 of the blank 1a. These faces 7a likewise are caused to assume positions perpendicular to the longitudinal dimension of the container 1, albeit externally of the square cross-sectional outline.

As discernible in figure 4, the triangular areas 14 are joined in part along a direction coinciding with the aforementioned joined area 16, so that this same area is extended on either side with no break in continuity.

Once the end portion 7 has been bent and folded, it will be secured hermetically by a seal effected along the joined area 16, forming the bottom end 8 and consequently the containing portion 3 of the container 1, at least in part.

To advantage, the end portion 7 disposed thus perpendicularly to the longitudinal dimension of the container 1 undergoes a further sealing operation designed to separate the stiffening elements 10 geometrically from the bottom end 8 of the container (figure 5). More exactly, this operation consists in sealing together the two thicknesses of each stiffening element 10 along a respective segment of the corresponding transverse crease line 11b, in other words along the base 10a of the relative triangle. Accordingly, each stiffening element 10 is

isolated from the enclosure 4, which as a result presents an internal space of substantially prismatic geometry having no interstitial spaces or cavities.

After the stiffening elements 10 have been sealed, the terminal portion 7 is bent once more along the segments of the transverse crease line 11b coinciding with the aforementioned bases 10a, in such a way as to fold the stiffening elements 10 over the bottom end 8 of the container (figure 6). In other words, each stiffening element 10 is rotated about the relative base 10a through 180° and flattened against the bottom of the container with its vertex 10b directed toward the element 10 opposite. In this position, the stiffening elements 10 are secured permanently to the bottom end 8 by a further sealing operation.

Once the containing portion 3 of the container 1 has been formed, the outlet portion 5 will likewise be folded and secured by further bending and sealing operations, which in the case of a container 1 as illustrated in figure 1 will include the additional step of fitting and securing a neck piece 9 to the outlet portion 5.

The problems associated with the prior art are overcome in accordance with the present invention, and the stated objects duly realized.

First and foremost, a container 1 according to the invention ensures that liquid food products can be kept over time in optimum condition, and not only products in general, but also those which are

particularly delicate and/or perishable.

In particular, with the inclusion of seals 10c applied selectively to areas of layered structure associated with the bottom end 8, namely the stiffening elements 10 created by double-folding the end portion 7 of the side wall 6 and incorporating interstitial spaces, these can be isolated from the main volume of the enclosure 4 and thus prevented from retaining droplets and/or residual traces of undesirable liquids, such as flushing fluids used to cleanse the inside of the container 1, or of the food product itself.

Clearly, by eliminating the risk of stagnation at the bottom of the container, it becomes possible to dispense with all the lengthy and costly procedures connected with inspecting and drying those areas where flushing fluids could linger and contaminate the packaged food product. Accordingly, the related production costs are significantly reduced, as also are the costs of marketing the container 1.